AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS:

1. (Original) A method of downconverting a first periodic voltage waveform into a second periodic voltage waveform, comprising:

obtaining from the first voltage waveform a plurality of temporally distinct samples respectively indicative of areas under corresponding half-cycles of the first voltage waveform;

combining the samples to produce the second voltage waveform; and

manipulating the samples to implement a filtering operation such that the second voltage waveform represents a downconverted, filtered version of the first voltage waveform.

2. (Original) The method of Claim 1, wherein said obtaining step includes transforming the first voltage waveform into a corresponding current waveform, and integrating each half-cycle of the current waveform.

3. (Previously presented) A method of downconverting a first periodic voltage waveform into a second periodic voltage waveform, comprising:

obtaining from the first voltage waveform a plurality of temporally distinct samples respectively indicative of areas under corresponding half-cycles of the first voltage waveform and transforming the first voltage waveform into a corresponding current waveform, and integrating each half-cycle of the current waveform wherein said

integrating step includes using each half-cycle of the current waveform to charge a corresponding capacitor;

combining the samples to produce the second voltage waveform; and

manipulating the samples to implement a filtering operation such that the second voltage waveform represents a downconverted, filtered version of the first voltage waveform.

4. (Original) The method of Claim 3, wherein said manipulating step includes, in said using step, using one of the half-cycles to charge a plurality of capacitors.

5. (Original) The method of Claim 4, wherein said manipulating step includes, in said combining step, dumping charge from different ones of said plurality of capacitors during respectively different periods of time.

6. (Original) The method of Claim 5, wherein said dumping step includes sharing the dumped charge with charge on a further capacitor.

7. (Original) The method of Claim 3, wherein said manipulating step includes, in said combining step, simultaneously dumping charge from a plurality of capacitors that have been charged by respective half-cycles of the current waveform.

8. (Original) The method of Claim 7, wherein said dumping step includes sharing the dumped charge with charge on a further capacitor.

9. (Original) The method of Claim 3, wherein said manipulating step includes, in said using step, using a plurality of the half-cycles to charge a single capacitor.

10. (Original) The method of Claim 9, wherein said last-mentioned using step includes using respective pluralities of the half-cycles to charge respective capacitors.

11. (Original) The method of Claim 10, wherein said manipulating step includes, in said combining step, simultaneously dumping charge from the respective capacitors.

12. (Original) The method of Claim 11, wherein said dumping step includes sharing the dumped charge with charge on a further capacitor.

13. (Original) The method of Claim 10, wherein said manipulating step includes, in said combining step, dumping charge from the respective capacitors during respectively different time periods that timewise overlap one another.

14. (Original) The method of Claim 13, wherein said dumping step includes sharing the dumped charge with charge on a further capacitor.

15. (Original) The method of Claim 1, wherein said filtering operation includes one of FIR and IIR filtering.

16. (Original) The method of Claim 1, wherein said filtering operation includes one of fractional coefficient filtering and differential coefficient filtering.

17. (Original) The method of Claim 1, wherein said filtering operation includes triangular coefficient filtering.

18. (Original) The method of Claim 1, wherein the first voltage waveform is an RF waveform.

19. (Original) An apparatus for downconverting a first periodic voltage waveform into a second periodic voltage waveform, comprising:

an input for receiving the first voltage waveform;

a sampler coupled to said input for obtaining from the first voltage waveform a plurality of temporally distinct samples respectively indicative of areas under corresponding half-cycles of the first voltage waveform;

a combiner coupled to said sampler for combining the samples to produce the second voltage waveform; and

at least one of said sampler and said combiner operable for manipulating the samples to implement a filtering operation such that the second voltage waveform represents a downconverted, filtered version of the first voltage waveform.

20. (Previously presented) An apparatus for downconverting a first periodic voltage waveform into a second periodic voltage waveform, comprising:

an input for receiving the first voltage waveform;

a sampler coupled to said input for obtaining from the first voltage waveform a plurality of temporally distinct samples respectively indicative of areas under corresponding half-cycles of the first voltage waveform, said sampler including a transconductance amplifier for transforming the first voltage waveform into a

corresponding current waveform, and a plurality of capacitors coupled to said transconductance amplifier for integrating each half-cycle of the current waveform;

a combiner coupled to said sampler for combining the samples to produce the second voltage waveform; and

at least one of said sampler and said combiner operable for manipulating the samples to implement a filtering operation such that the second voltage waveform represents a downconverted, filtered version of the first voltage waveform.

21. (Original) The apparatus of Claim 20, wherein said sampler is operable for using each half-cycle of the current waveform to charge a corresponding one of said capacitors.

22. (Original) The apparatus of Claim 21, wherein said sampler is operable for using one of the half-cycles to charge a group of said capacitors.

23. (Original) The apparatus of Claim 22, wherein said combiner is operable for dumping charge from different ones of said group of capacitors during respectively different periods of time.

24. (Original) The apparatus of Claim 23, wherein said combiner includes a further capacitor coupled to said group of capacitors, said combiner operable for sharing charge dumped from said group of capacitors with charge on said further capacitor.

25. (Original) The apparatus of Claim 21, wherein said combiner is operable for simultaneously dumping charge from a group of said capacitors that have been charged by respective half-cycles of the current waveform.

26. (Original) The apparatus of Claim 25, wherein said combiner includes a further capacitor coupled to said group of capacitors, said combiner operable for sharing the charge dumped from said group of capacitors with charge on said further capacitor.

27. (Original) The apparatus of Claim 21, wherein said sampler is operable for using a plurality of the half-cycles to charge one of said capacitors.

28. (Original) The apparatus of Claim 27, wherein said sampler is operable for using respective pluralities of the half-cycles to charge respective ones of a group of said capacitors.

29. (Original) The apparatus of Claim 28, wherein said combiner is operable for simultaneously dumping charge from said group of capacitors.

30. (Original) The apparatus of Claim 29, wherein said combiner includes a further capacitor coupled to said group of capacitors, said combiner operable for sharing the charge dumped from said group of capacitors with charge on said further capacitor.

31. (Original) The apparatus of Claim 28, wherein said combiner is operable for dumping charge from said respective ones of said group of capacitors during respectively different time periods that timewise overlap one another.

32. (Original) The apparatus of Claim 31, wherein said combiner includes a further capacitor coupled to said group of capacitors, said combiner operable for sharing charge dumped from said group of capacitors with charge on said further capacitor.

33. (Original) The apparatus of Claim 20, including an output coupled to said combiner for providing the second voltage waveform to a driver stage, said combiner including a plurality of switches connected between said capacitors and said output for selectively connecting said capacitors to said output.

34. (Original) The apparatus of Claim 33, wherein said output includes first and second electrically distinct nodes, and said second voltage waveform is provided in differential format at said output.

35. (Original) A communication receiving apparatus, comprising:

an input for receiving a communication signal formed as a first periodic voltage waveform;

a mixer coupled to said input for downconverting the first periodic voltage waveform into a second periodic voltage waveform, including a sampler coupled to said input for obtaining from the first voltage waveform a plurality of temporally distinct samples respectively indicative of areas under corresponding half-cycles of the first voltage waveform, a combiner coupled to said sampler for combining the samples to produce the second voltage waveform, and at least one of said sampler and said combiner operable for manipulating the samples to implement a filtering operation such that the second voltage waveform represents a downconverted, filtered version of the first voltage waveform; and

a signal processing portion coupled to said mixer for receiving and processing the second voltage waveform.

36. (Original) The apparatus of Claim 35, wherein said communication signal is an RF communication signal.

37. (Original) The apparatus of Claim 35, wherein said filtering operation includes one of FIR and IIR filtering.

38. (Original) The apparatus of Claim 35, wherein said filtering operation includes one of fractional coefficient filtering and differential coefficient filtering.

39. (Original) The apparatus of Claim 35, wherein said filtering operation includes triangular coefficient filtering.

Please add the following claims:

40. (New) The method of Claim 1, wherein said manipulating decimates the samples.

41. (New) The apparatus of Claim 19, wherein said manipulating decimates the samples.

42. (New) A method, comprising the steps of:

obtaining from a first voltage waveform a plurality of temporally distinct samples respectively indicative of areas under corresponding half-cycles of the first voltage waveform;

combining the samples to produce a second voltage waveform; and

decimating the samples to implement a filtering operation such that the second voltage waveform represents a downconverted, filtered version of the first voltage waveform.

43. (New) An apparatus, comprising:

an input for receiving a first voltage waveform;

a sampler coupled to said input for obtaining from the first voltage waveform a plurality of temporally distinct samples respectively indicative of areas under corresponding half-cycles of the first voltage waveform;

a combiner coupled to said sampler for combining the samples to produce a second voltage waveform; and

at least one of said sampler and said combiner operable for decimating the samples to implement a filtering operation such that the second voltage waveform represents a downconverted, filtered version of the first voltage waveform.